Chapter 1: Purpose of and Need for Action

This Environmental Impact Statement (EIS) for the Southern Corridor has been prepared according to the provisions of the National Environmental Policy Act (NEPA) and the corresponding regulations and guidelines of the Federal Highway Administration (FHWA), the lead federal agency. This document also conforms to the requirements of the Utah Department of Transportation (UDOT), the project sponsor and the lead state agency.

Agencies cooperating with the preparation of this EIS include the U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), and the Bureau of Land Management (BLM). This EIS will be adopted by BLM to fulfill NEPA compliance requirements pertaining to the right-of-way (ROW) grant across public lands for this project. The proposed action is located in southern Utah, near the cities of St. George, Washington City, and Hurricane (see Figure 1-1, Project Location).

The Southern Corridor project has been defined as a pilot project for streamlining the EIS process among FHWA, UDOT, and EPA. One of the project's goals is to include in the EIS information for local city, county, and agency decision-makers on the potential cumulative impacts of growth in the region, and on how planning decisions made to accommodate growth could affect the environment.

Although state, county, and local planning decisions are outside the authority of both FHWA and UDOT, Chapter 6 (Smart Growth) includes an analysis of sustainable growth initiatives and how these initiatives, if implemented, could reduce impacts to the environment and provide economic and social benefits. Some of these scenarios include land use planning strategies to reduce the land required to support development, the number of vehicle trips and thus air pollution, and the consumption of vital water and energy resources. Including sustainable growth initiatives in this EIS demonstrates to city, county, and state planning agencies the economic, social, and environmental benefits realized by considering these initiatives in planning processes.

This EIS analyzes the potential environmental consequences of the proposed Southern Corridor. The decision to be made, based on this analysis, is whether to select the No-Build Alternative or one of the build alternatives. If one of the build alternatives is selected, the decision may be to build only that part of the corridor required to meet projected transportation demand at the time of the decision, with the remainder of the corridor being delayed until it is required.

As the area grows, the Southern Corridor alignments and roadway design studied in this EIS may require some modifications before construction. The potential modifications would be reviewed to ensure that appropriate environmental documentation has been prepared.

1.1 Project Location and Status

The proposed action (that is, building the Southern Corridor) was initiated by requests from local residents, the first step toward implementing plans for a future transportation corridor. The Southern Corridor would provide a regional link east of Interstate 15 (I-15), beginning at I-15 about 3 miles north of the Arizona border and connecting with State Route 9 (SR 9) near Hurricane. The length of the route is between 20 and 26 miles, depending on the alternative selected.

This transportation facility is needed to provide regional mobility while serving existing and future development and to reduce some congestion on local surface arterial streets and intersections. The proposed transportation corridor is not intended to reduce future traffic on I-15 through St. George and Washington City. The route is necessary to accommodate regional transportation between existing and planned development east of I-15 and to effectively move traffic between I-15 and SR 9.

The connections with I-15 and SR 9 are important for two reasons. First, I-15 is the major north-south interstate corridor through Utah. Second, SR 9 serves as the main connection between I-15, Hurricane, Zion National Park, and Arizona (via SR 59). In addition, the facility would provide access to the proposed St. George replacement airport, which is expected to be operational in 2008. The Southern Corridor as defined would be an independent transportation facility and would not require the implementation of other roadway projects to be usable, including any additional segments of the overall corridor.

This section describes the project; presents the status of the project; and discusses the project history, governmental actions taken to date, and regional, corridor, and local planning activities. Necessary general improvements in the area are also described. The proposed action identified from the corridor analysis is presented briefly in this chapter and is discussed in greater detail in Chapter 2, Alternatives.

1.1.1 Proposed Action

The proposed transportation facility would be a four-lane, limited-access, divided highway extending from I-15 northeastward between 20 and 26 miles to connect

with SR 9 near Hurricane. The entire project is located within Washington County, Utah. About 10 to 12 interchanges, depending on the build alternative selected, are proposed for the route in addition to a pedestrian, bicycle, and equestrian trail that would parallel the highway.

1.1.2 History and Background of the Need

Over the past several years, the Southern Corridor has been the subject of numerous studies and plans concerning the area's need for transportation improvements and expanded capacity. Since the 1980s, transportation master plans for the southern part of Utah have included a regional transportation system to accommodate traffic and future growth in the part of Washington County addressed by the proposed action. The history of the Southern Corridor is as follows:

- In September 1994, the Transamerica Transportation Corridor was defined as an interstate highway corridor linking the east and west coasts of the United States. Part of that corridor is located in southern Utah and encompasses some of the same study area as the proposed action.
- In June 1996, a corridor study was completed which examined the feasibility of building a highway within the Transamerica Transportation Corridor to connect I-15 with SR 59 about 5 miles north of the Arizona border. The study determined that this segment could be built, yet recognized that the costs of crossing Warner Ridge and the Hurricane Cliffs area would be high (MK Centennial 1996).
- In October 1996, the Grand Staircase Escalante National Monument was designated, restricting resource development on the Kaiparowits Plateau. The likelihood of trucks laden with coal traveling through Hurricane was reduced, lessening the immediate need for a bypass route directly from SR 59 to I-15.

Designation of the Grand Staircase Escalante National Monument, combined with the high costs of constructing a road through the Warner Ridge and Hurricane Cliffs area, resulted in a reexamination of the transportation system for this part of the state. It was recognized there is a need to provide an alternative route from I-15 to SR 9 to accommodate regional transportation demands between existing and planned development east of I-15 and to efficiently move traffic between I-15 and SR 9. To meet this need, yet provide the flexibility for future expansion according to national transportation goals, a modification to the proposed route was suggested under the Transamerica Transportation Corridor concept for a route between I-15 and SR 9.

1.1.3 Area Planning Studies

Washington County has experienced tremendous growth in the past 30 years. In 1970, the county had a population of 13,669, which grew to 90,354 by 2000 (U.S. Census Bureau 2000). This is an average yearly growth rate of 6.5%.

The establishment of a metropolitan planning organization (MPO) is in progress in the area. Regional planning has been performed by UDOT, the Five County Association of Governments, Washington County, and the individual cities in the area. In 2000, the population in the area had reached the 50,000-person threshold needed to create an MPO. Until the MPO is established, regional transportation planning will be performed by an interim committee known as the Dixie Transportation Advisory Committee. Committee membership consists of representatives from cities, agencies, and the county.

1.1.3.1 Regional Planning Studies

Utah Statewide Transportation Improvement Program. UDOT's Statewide Transportation Improvement Program (STIP) is a five-year program of highway and transit projects for Utah, published yearly.

The STIP serves two basic purposes. First, it documents Utah's compliance with the requirements of the Transportation Equity Act for the 21st Century and is the basis for approval of federal highway and transit funds from FHWA and the Federal Transit Administration. Second, it is UDOT's official work plan for the development of projects from the stages of concept development, environmental studies, ROW acquisition, and plan development through solicitation of bids for construction projects.

The fiscal year 2002–2006 STIP describes various projects within the St. George region, including mass transit (bus service through the Rural Public Transit Program) and various highway improvement projects. Highway improvement projects include three I-15 interchanges: 1) a new interchange at Atkinville, the southern terminus of the proposed Southern Corridor; 2) a reconstructed interchange at Reference Post 10 (RP 10) in Washington City; and 3) a new interchange at RP 13 in Washington City. A variety of bridge and pavement rehabilitation projects is also included. The proposed road construction for the Southern Corridor is not included in the STIP except for the Atkinville interchange at I-15.

Coordination Plan for Washington County's Urbanizing Region (Winston Associates, Inc. and others 1997). This document describes strategies that the county and partnering cities would use to address growth and development issues, and establishes goals and guidelines for shaping growth to suit all affected

municipalities. This planning study included the Southern Corridor in the county's long-range plan as providing future regional access to Hurricane, Washington City, and Santa Clara.

Dixie Transit Feasibility Study (UDOT 1999b). The study contains an assessment of the feasibility of operating mass transit in the Dixie area of southern Utah. The study addresses the existing need for transit, the existing and future resources necessary to provide transit service, and the institutional and agency-related issues involved in forming and operating a transit district.

1.1.3.2 Local Planning Studies and General Plans

Several cities in the area have produced planning studies and general plans that address the need for the Southern Corridor.

St. George Capital Facilities Plan (St. George Public Works Department 2001). The plan describes the wastewater, storm water, and roadway needs in the upcoming 5, 10, 15, and 20 years. Growth was forecasted using a conservative, straight-line projection of 5 to 6% compounded yearly, as is appropriate for a capital facilities plan. The *St. George Capital Facilities Plan* estimates the cost and priority of, and potential funding source for, each project. The plan identifies the Southern Corridor as one of the long-range capital improvements.

St. George Transportation Improvement Plan (City of St. George 1998). This document describes the need for transportation improvements in St. George, including the state participation project. The *St. George Transportation Improvement Plan* includes a general alignment for the proposed Southern Corridor.

St. George Working Draft General Plan (Winston Associates, Inc. 2001). The *St. George Working Draft General Plan* details the vision and goals of the community and how future transportation planning plays a role in growth, providing a general guideline for land use decisions. The Southern Corridor is included in the section that discusses how and where the community expects growth to occur.

St. George Traffic and Transportation Master Study (Parsons Brinckerhoff 1995). The *St. George Traffic and Transportation Master Study* identifies the Southern Corridor as part of the anticipated transportation system and addresses the need to plan for the Southern Corridor since a large amount of planned development would occur east and south of I-15. A transportation planning model was also developed as part of this study.

Development Area Exhibit, State of Utah School and Institutional Trust Lands Administration (Hodges 2000). This document shows proposed land use

designation for Utah School and Institutional Trust Lands east of I-15 and includes the Southern Corridor as providing access to the proposed development.

South Block Property Map, St. George, Land Use Plan (Ward Engineering Group 2000). This document shows proposed land use for the Leucadia development south of the proposed St. George replacement airport and includes the Southern Corridor as providing access to the proposed development.

Washington City Transportation Master Plan (Sear-Brown 2002). This document shows the Southern Corridor as part of the Washington City transportation network and the need for future city roads to connect to the Southern Corridor.

1.1.3.3 Future Regional Planning Coordination

Once the population of a city or group of cities reaches 50,000 and they share a common market area, the city or group is designated an urbanized area. Generally, this designation is made by the U.S. Department of Commerce within a few years of the national decennial (10-year) census. The St. George area was designated an urbanized area as of the 2000 census. The FHWA and Federal Transit Authority require that, because of this designation, an MPO must be established to carry out the 3C Transportation Planning Process (Continuing, Comprehensive, and Cooperative). There are currently three other MPOs in Utah: the Wasatch Front Regional Council, which serves the Salt Lake and Ogden urbanized areas; the Mountainland Association of Governments, which serves the Provo-Orem area; and Cache MPO, which serves greater Logan.

The establishment of an MPO for the project area is now in progress. The charter agreement is being prepared for approval, and the Five County Association of Governments is currently developing a public involvement and long-range transportation planning process for use by the MPO, once it is established. It is anticipated that the MPO will use any data and processes from the Southern Corridor EIS, including, but not limited to, the Quick Response System II (QRSII) model.

Currently, regional transportation planning is performed by the interim Dixie Transportation Advisory Committee, a proxy organization consisting of voting members from Ivins, Santa Clara, St. George, Washington City, Washington County, and UDOT. Committee members also include the Five County Association of Governments, Hurricane, and the Dixie Area Rapid Transit System. FHWA also participates on the committee. The designation of the Dixie Transportation Planning Committee as an MPO will be made by the governor. The MPO will then be eligible for additional FHWA and Federal Transit Administration funds for both planning and projects.

The Five County Association of Governments has one staff person dedicated to the development and start-up of the MPO. Once established, the MPO will formulate a Transit Development Program and a Long-Range Transportation Plan. However, due to the timing of the designation and the availability of planning funds at that time, those efforts have not occurred. In the meantime, the proxy MPO is involved with the Southern Corridor study efforts as part of the advisory committee.

1.2 Existing Transportation System Linkage

This section describes the existing transportation system, its various modes, and how these modes are connected and interrelate to form the overall transportation network.

The current regional linkage system in the study area is limited, primarily because of geographic and environmental factors that have effectively restricted transportation routes. Salt Lake City and Phoenix are examples of efficient grid systems built to facilitate traffic movement and provide system linkage with arterial routes. The Southern Corridor would provide a transportation system to facilitate a regional linkage network for the area.

1.2.1 Roadways

As shown in Figure 1-2, Regional and Local Roadways, the existing roadway system consists of freeways, state routes, and local arterials. Each facility of the existing roadway system is described below.

1.2.1.1 Interstate 15

I-15 is an essential element of the local, regional, and national circulation system. As part of the national interstate system, it provides a north-south link between southern California and the Canadian border. It is the only continuous major north-south roadway for travel within Utah and provides north-south access between Las Vegas, Mesquite, St. George, Washington City, Hurricane, and Cedar City. I-15 is currently a four-lane facility through the St. George area.

Interchanges. I-15 has five interchanges within the study area, as listed below by jurisdiction:

Hurricane:	SR 9
Washington City:	SR 212, Middleton Drive
St. George:	SR 34, St. George Blvd SR 18, Bluff Street Bloomington

Underpasses. There are underpasses at the following locations:

- Main Street in Washington City (north of the SR 212/Middleton Drive interchange)
- 100 South in St. George (just south of the SR 34/St. George Blvd. interchange)
- 700 South in St. George (midway between the SR 34 and SR 18 interchanges)

1.2.1.2 State Route 9

SR 9 is the major east-west route from I-15 serving Hurricane, Zion National Park, and SR 89. SR 9 has two lanes in each direction and a median turn lane between I-15 and Hurricane.

Rigorous access management along SR 9 between I-15 and Hurricane has preserved the capacity of the corridor.

1.2.1.3 State Route 34, St. George Boulevard

St. George Boulevard is a major east-west route connecting I-15 to Bluff Street. It has five lanes running its entire length with two lanes in each direction and a two-way left turn lane. Multiple accesses and traffic signals make St. George Boulevard a low-speed, highly accessed arterial.

1.2.1.4 State Route 18, Bluff Street

Bluff Street runs between Snow Canyon on the northern boundary of St. George southward to the Bluff Street interchange with I-15. Bluff Street provides north-south access for Ivins, Santa Clara, and the west side of St. George. Bluff Street has five lanes with two lanes in each direction and a two-way left turn lane. Multiple accesses and traffic signals make it a low-speed arterial.

1.2.1.5 North-South Arterials

The local north-south arterial streets paralleling I-15 to the south and east are sparse, discontinuous, and constrained by the general topography of the area, including the Virgin River and a series of cliffs, bluffs, and other geological features. These streets function as low- to medium-capacity facilities primarily serving local traffic. This arterial system consists of:

- River Road in St. George
- Little Valley Road in St. George
- Fort Pearce Road in St. George
- Washington Fields Road in Washington City

1.2.1.6 East-West Arterials

Local east-west arterial streets are constrained by the general topography of the area, including the Virgin River and a series of cliffs, bluffs, and geological formations. The limited number of underpasses and overpasses crossing I-15 somewhat hinders east-west movement, though it is accommodated at the interchanges. Therefore, the existing east-west streets lack continuity and primarily serve local access. This arterial system consists of the following roads:

- Telegraph Road in Washington City/Hurricane
- Red Cliff Drive in St. George
- Riverside Drive in St. George
- 1450 South in St. George
- Brigham Road in St. George
- Sunset Boulevard/Santa Clara Boulevard in St. George, Santa Clara, and Ivins
- 100 South and 700 South in St. George

1.2.2 Public Transit Service

Currently there is no long-range transit plan for the St. George area. The *Dixie Area Transit Feasibility Study* was conducted in May 1999 by UDOT and the Five County Association of Governments. The study focused on three areas:

1. The need for transit
2. The existing and future resources necessary to provide transit service
3. The institutional and agency issues related to forming and operating a transit district

No transit projections were provided in the *Dixie Area Transit Feasibility Study* of the St. George area. Additional planning for the transit system, including identifying funding sources and a more permanent operating agency, will be conducted by the MPO once it is established. The Five County Association of Governments is currently sponsoring the planning and development of the Dixie Area Rapid Transit System. At this time, there is no secure, long-term federal, state, or local transit revenue stream. There is reluctance to place the formation of a transit district on a ballot, and the current Federal Transit Administration funds are discretionary (Section 5311).

There are two issues associated with transit in the St. George area:

1. A long-range, multimodal, regional transportation plan does not exist.
2. No voter-approved, established transit district exists.

Given these issues, establishing a solid transit forecast is not reasonable or prudent. The limited success of the recently implemented system bodes well for a transit system in the future, but without a regional plan, estimating future use is not practical.

1.2.2.1 Bus Service

Bus service in the St. George area is in its infancy. The service is running without a transit tax or a public governing body. The Five County Association of Governments recently hosted the planning and development of the Dixie Area Rapid Transit System. Following the new urbanized designation resulting from the 2000 census, operation of the bus system is anticipated to transition to a public governing body.

Bus Service Area. The general boundaries of the service area are Dixie Drive on the west, Green Springs Drive in Washington City on the east, Sunset Boulevard and St. George Boulevard on the north, and 700 South on the south.

Types of Service. Four bus routes operate between 6:30 AM and 5:30 PM, six days a week excluding Sunday (see Figure 1-2, Regional and Local Roadways). All are local routes with no express routes. Local service bus routes have stops at regular intervals with the spacing of stops varying from about 0.3 mile to every two to three blocks. Headways for the buses are generally 30 minutes. Ridership during June 2001 was estimated by the Five County Association of Governments at 5,000 and has been increasing since the system's inception. Currently, there are no plans to expand the existing bus system.

1.2.3 Transportation Management Strategies

Transportation management strategies (TMS) are intended to improve roadway efficiency. The primary purpose of TMS is to "get the most out of the existing system" through cost-effective measures such as improving intersections, adding auxiliary lanes between interchanges, widening and lengthening ramps, modifying existing interchanges, managing incidents, providing motorist information systems, and metering ramps.

1.2.3.1 Arterial Signal Systems

UDOT and St. George have worked in cooperation to form a coordinated signal system covering much of St. George. The system uses spread-spectrum radio to connect the controllers and can be accessed remotely via dial-up software. The coordinated system reduces driver delay at intersections by maximizing available green time for grouped vehicles.

1.2.4 Modal Interrelationships

Modal interrelationships deal with how roadways, airports, and mass transit services interface with and complement each other as part of an integrated system.

1.2.4.1 Airports

The existing St. George Municipal Airport is on the west side of St. George, located atop a bluff just west of Bluff Street. Access to the airport is by Airport Road, which can be accessed only from St. George Boulevard, Bluff Street, or a series of residential streets west of Bluff Street. The existing airport serviced 32,910 arrivals and departures in 1998 (Creamer and Noble, Inc. 2001). The existing airport cannot accommodate the larger aircraft necessary to meet the growing air travel demand for the region.

The St. George replacement airport is in the planning stage, and federal funding is currently being reviewed. The airport would be located in the southeast part of St. George near the proposed Southern Corridor. The new airport would accommodate the projected demand for passengers, estimated to be as high as 191,900 by 2018 (Creamer and Noble, Inc. 2001). Existing roadways near the new airport are in the process of being expanded or would require expansion to accommodate the generated traffic. The proposed Southern Corridor would provide alternate access to the new airport site and relieve projected traffic on existing local arterial roads.

1.2.4.2 Mass Transit Services

As noted in Section 1.2.2, Public Transit Service, the Dixie Area Rapid Transit System is currently operating a four-route service concentrated mostly within St. George with some service to Washington City. The bus system could be expanded with development of a dedicated funding source. The primary purpose of the system is to provide access to and around St. George, concentrating on major destinations such as Dixie College.

1.2.4.3 Bicycle and Pedestrian Trails

St. George has developed a sizeable trail system for its citizens. For a more detailed discussion, see Section 3.3.9, Recreation Resources. While there are no designated bicycle routes to the downtown area, the streets in downtown St. George are wide enough to accommodate bicycles and pedestrians. St. George plans to expand the trail system in the future, including adding a bicycle route system throughout the city. Other cities in the area plan to connect trails to the St. George trail system. The trail system provides excellent mobility for pedestrians and bicyclists and would improve with future additions to the system.

1.3 Corridor Capacity and Level of Service

Assessing the existing traffic operations was necessary to study potential effects of the No-Build and build alternatives. Key freeway and arterial roadways within the network were examined, and volumes were compared with capacities to determine the quality of the existing operations.

1.3.1 Level of Service

1.3.1.1 Categories

Level of service (LOS) is measured by a number of variables, the most critical being the ability to maintain roadway design speeds and comfort. Six LOS categories from A to F are used to describe traffic conditions as defined in Table 1.3-1.

Table 1.3-1. LOS Definitions and Flow Rates

LOS	Definition
A	Free-flow operations. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. This LOS affords the driver a high level of physical and psychological comfort. Incident effects are easily absorbed at this level.
B	Free-flow operations. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high. Incident effects are still easily absorbed.
C	Speeds continue to remain high, but freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more vigilance on the driver's part. The driver now experiences a noticeable increase in tension because of this additional vigilance. Minor incidents may still be absorbed, but the local deterioration in service will be substantial.
D	Speeds begin to decline slightly. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences a reduced physical and psychological comfort level. Even minor incidents can be expected to cause queuing because the traffic stream has little space to absorb disruptions.
E	Operations at this level are volatile because there are virtually no usable gaps in the traffic stream. Any disruption to the traffic stream, such as a vehicle entering from a ramp or changing lanes, can cause following vehicles to give way to admit the vehicle. This can establish a disruption wave that propagates throughout the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate even the most minor disruptions, and any incident can be expected to produce a serious breakdown with extensive queuing. Maneuverability within the traffic stream is extremely limited, and the level of physical and psychological comfort afforded the driver is extremely poor.
F	Breakdown in vehicle flow, resulting in stop-and-go conditions. The level of physical and psychological comfort afforded the driver is extremely poor.

Source: National Research Council, Transportation Research Board 1998

1.3.1.2 Planning Goals

The appropriate LOS to be used for planning and designing highway improvements is determined by weighing the desires of motorists against the resources available for satisfying those desires. The maximum degree of congestion during the design year on a proposed highway is realistically determined by UDOT in three steps:

1. Determining the operating conditions that a majority of the motorists would accept,
2. Determining the highest standard of highway improvement that UDOT can support, and then
3. Reconciling the demands of motorists and the general public with the means available to meet these demands.

The highway design objective of this corridor is for a highway with cross-sectional and alignment characteristics that balance the physical and psychological comfort of the driver with economic and environmental concerns.

UDOT policy states:

> Optimum highway geometric standards will be established and maintained for all classes of State highways consistent with the traffic requirements estimated for a minimum future period of twenty years. These standards will be established within the framework of the policies of the American Association of State Highway and Transportation Officials (AASHTO) (08A-1: Highway Geometric Standards).

The 1994 AASHTO *Policy on Geometric Design of Highways and Streets* states:

> As may be fitting to the conditions, the highway agency should strive to provide the highest level of service feasible. In heavily developed sections of metropolitan areas, conditions may necessitate the use of level of service D for freeways and arterials, but such use should be rare and at least level of service C should be strived for. For some urban and suburban highways, conditions may necessitate the use of level of service D (p. 87).

UDOT further states its objective:

> To create a facility with dimensional and alignment characteristics such that the resulting design service flow rate is at least as great as the traffic flow rate during the 15-minute period of the design hour, but not to a level as to represent extravagance or waste. Where this objective is accomplished, a well-balanced, economical, and environmentally sensitive highway system will result.

1.3.1.3 Southern Corridor Level of Service Goal

In light of the federal guidance and stated UDOT policy, the design objective in the Southern Corridor is LOS C. However, with the consideration of the physical, environmental, and fiscal constraints, LOS D would be the acceptable minimum design standard.

1.3.2 Existing Capacity and Level of Service on Key Roads

Most of the roads in the study area are in the north part along I-15. The southern part of the study area contains few roads, which carry low volumes of traffic and therefore have acceptable LOSs. This area in the southern part of the study area is projected to have the majority of future growth and development.

To provide an overview of current LOS in the region, 1999 average daily traffic (ADT) volumes were provided by UDOT for I-15, SR 9, SR 212, River Road, and Washington Fields Road. St. George provided volumes for Red Cliff Drive (1998) and Brigham Road (1999). To measure the LOS, these ADT volumes were compared to their respective capacities. LOS not only indicates the current quality of operation, but also gives an indication of a facility's ability to accommodate future traffic.

Table 1.3-2 summarizes the key arterial roadways in the study area and the capacity associated with each.

Table 1.3-2. Existing Roadway LOS in the Study Area

Arterial Road	Road Type	Lanes	Daily Volume (ADT)	Capacity at LOS C (ADT)	Capacity at LOS D (ADT)	Current LOS
I-15, Brigham Rd. to Bluff St.	Interstate	4	35,000	63,000	73,000	C or better
SR 9, west of Hurricane	Arterial–Rural	5	15,600	22,000	28,000	C or better
Brigham Rd.	Arterial–Rural	2	11,700	12,000	15,500	C
Red Cliff Dr. at St. George Blvd.	Arterial–Urban	5	17,800	28,000	32,500	C or better
Washington Fields Rd. at Washington Dam Rd.	Arterial–Rural	3	11,500	13,000	16,500	C
River Rd. at Riverside Dr.	Arterial–Urban	3	7,000	12,000	14,000	C or better
SR 212	Arterial–Suburban	5	15,000	26,500	30,500	C or better

Source: Thresholds adapted for Utah by Fehr & Peers from National Research Council, Transportation Research Board 1998

1.4 Roadway and Safety Deficiencies

The southern end of St. George, Washington City, and Hurricane do not have a regional transportation facility to convey traffic between the three cities as the area grows. This area is currently served by north-south collector and arterial streets with only a few access points across the Virgin River and to I-15 (specifically, River Road and Washington Dam Road).

There are few true arterial streets in the southwestern part of St. George and the southern part of Washington City. Streets such as River Road, 2450 South, Washington Fields Road, Little Valley Road, and Riverside Drive appear to be arterial streets on a map, in that they serve through trips. Many of these roads more closely resemble collector roads, having been built to fit the topography of the area and to provide access to property. Without reconstruction, the physical characteristics of these roads are not consistent with the primary function of arterial streets to serve through traffic, with access to property typically a secondary function. Winding horizontal and sharp vertical curves, tight shoulders, multiple accesses, and the lack of turn lanes reduce travel speed, hinder sight distance, and increase the risk of accidents when traffic volumes increase with through trips.

Some facilities have already been improved, such as Brigham Road between I-15 and River Road, but many more would need to be updated to create an effective network of arterial streets. However, improvements to many of these roads and the ability to add additional arterial streets are constrained geographically by

natural features (see Figure 1-3, Natural Constraints), the ability to obtain additional ROW, and existing buildings and homes along the roadways. Some planned improvements to facilities, such as those to Washington Fields Road, would likely address some of these geometric concerns. But as demand grows in the southern area of the cities without a regional transportation facility, deficiencies in these roadways will be magnified and will likely result in increasingly delayed travel and higher accident rates.

1.5 Social Demands and Economic Development

1.5.1 Population Growth

Population estimates for the study area are available from the State of Utah through the Governor's Office of Planning and Budget (GOPB). The estimates are annually adjusted using U.S. census estimates and counts.

The Governor's Office of Planning and Budget uses a demographic model called the Utah Process Economic and Demographic Model to estimate county-level population forecasts. It is a complex demographic model that incorporates a cohort model with an economic model. These county-wide population forecasts are in turn disaggregated by the local associations of governments into cities and unincorporated areas in each county. Washington County belongs to the Five County Association of Governments, which was responsible for distributing the 2030 population forecasts among the jurisdictions.

The land uses and population estimates for St. George, Washington City, and Hurricane were reviewed with members of the project study team to verify the population-level forecasts. For St. George in particular, future land use plans reflect the conversion of much of the area in the southern part of the city boundaries from rural to planned residential, retail, institutional, and other urban land uses. St. George's land use changes are identified in their draft comprehensive plan, which did not fully identify an associated roadway system to handle this planned growth.

St. George believed that their population forecast was low and that it needed to be reevaluated. In response to this concern, the draft future land use map for St. George was used to estimate population in 2030. The result of this was a 2030 population estimate for St. George that was about 21% higher than the Governor's Office of Planning and Budget's estimate (147,990 versus 122,727). St. George believed that the population forecast of 147,990 in 2030 was reasonable. This adjustment was also discussed with the Governor's Office of Planning and Budget. The Office of Planning and Budget provides only county-

level controls; city-level controls are provided by the Five County Association of Governments.

The minor adjustments to the population numbers, based on a greater level of land use analysis, are reasonable. Population annual growth rates were forecasted for 1994, the calibration year for the model, and 2030, the final year considered in the study. Annual growth rates by municipality in the study area vary between 3.49% in Santa Clara and 4.37% in Ivins. Forecasted growth rates in St. George, Washington City, and Hurricane are 3.89%, 3.50%, and 3.84%, respectively.

1.5.2 Household Growth

Countywide, the average household size is projected to decrease from 2.97 in 2000 (U.S. Census Bureau 2000) to 2.61 in 2030 (GOPB 2001). The decreasing trend in household size is anticipated to occur in each municipality in the study area. The average 2030 household sizes by municipality were used to calculate the future number of dwelling units by municipality. Annual growth rates in dwelling units by municipality in the study area vary between 3.85% in Santa Clara and 4.91% in Ivins. Forecasted growth rates in St. George, Washington City, and Hurricane are 4.25%, 3.96%, and 4.32%, respectively. Dwelling units in St. George are forecasted to number 56,700 by 2030.

Table 1.5-1 shows the projected growth in population and dwelling units for Ivins, Santa Clara, St. George, Washington City, and Hurricane. The calculated annual population and dwelling unit growth rates are an average yearly compounded rate over the 29-year planning period. This annual growth rate could vary significantly from year to year.

Table 1.5-1. 1994–2030 Population and Dwelling Unit Growth Rates

Municipality	1994 Population	2000 Population	2030 Population	Annual Compounded Growth Rate 1994 to 2030 (Population)	1994 Average Household Size	1994 Dwelling Units	2030 Average Household Size	2030 Dwelling Units	Annual Compounded Growth Rate (Dwelling Units)
Ivins	2,464	4,450	11,477	4.37%	3.47	710	2.88	3,984	4.91%
Santa Clara	3,403	4,630	11,710	3.49%	3.98	855	3.51	3,334	3.85%
St. George	37,526	49,663	147,990	3.89%	2.96	12,680	2.61	56,701	4.25%
Washington City	5,314	8,186	18,351	3.50%	3.27	1,625	2.79	6,583	3.96%
Hurricane	4,919	8,250	19,113	3.84%	2.36	1,509	2.76	6,925	4.32%
Total	53,626	66,993	208,641	3.85%	—	17,379	—	77,527	4.24%

St. George population estimated as described in Section 1.5.1, Population Growth.

2000 population from U.S. Census Bureau 2000.

2030 average household size calculated from 2000 U.S. census and projected 2030 Governor's Office of Planning and Budget household size for Washington County.

Source: Population estimates from Governor's Office of Planning and Budget based on 2000 provisional baseline

1.5.3 Employment Growth

Total employment in Washington County is estimated by the Governor's Office of Planning and Budget to be 46,001 in 2000. Employment in the county is forecasted by Governor's Office of Planning and Budget to increase 166% between 2000 and 2030, and would translate to an anticipated 122,284 jobs in Washington County in 2030. In St. George alone, total employment is projected to increase from 18,345 in 1994 to 97,827 in 2030, an increase of 433%.

While the Office of Planning and Budget projections are not disaggregated by municipality, the distribution of these jobs in municipalities in Washington County is anticipated to closely resemble the distribution seen today. The largest employment center in 2030 remains St. George, followed by Hurricane and Washington City. Table 1.5-2 shows the projected growth in employment for both retail and nonretail employees for Ivins, Santa Clara, St. George, Washington City, and Hurricane. The calculated annual employment growth rates are an average yearly compounded rate through the 2030 planning period.

Table 1.5-2. 1994–2030 Retail and Nonretail Employment Growth Rates

Municipality	1994 Retail Employees	2030 Retail Employees	Annual Compounded Growth Rate (Retail Employees)	1994 Nonretail Employees	2030 Nonretail Employees	Annual Compounded Growth Rate (Nonretail Employees)
Ivins	23	120	4.69%	56	736	7.42%
Santa Clara	73	394	4.79%	260	1,318	4.61%
St. George	5,878	32,283	4.85%	12,467	65,544	4.72%
Washington City	95	796	6.08%	937	2,995	3.28%
Hurricane	512	2,446	4.44%	1,478	7,337	4.55%
Total	6,581	36,039	4.84%	15,198	77,930	4.65%

Source: GOPB 2001 with interpretation for Washington City

1.6 Transportation Demand

The southern parts of St. George, Washington City, and Hurricane have little transportation infrastructure and low transportation demand as the area has not been developed like the portions adjacent to and north of I-15. The primary travel demand in the southern area will occur from future planned development that would need access to St. George, Washington City, and Hurricane. Although the demand in the northern part of the study area will not be the primary driver for the need for a transportation facility in the south, this chapter provides an overview of the expected future transportation demand in the area. To develop the regional travel demand, the QRSII model was used; see Appendix F, Travel Demand Model.

1.6.1 Transportation Demand in 2030

1.6.1.1 Planned Growth and Development near the Southern Corridor

Efforts on the part of St. George, Washington County, Washington City, and Hurricane to plan for and coordinate Southern Corridor area development have resulted in a well-planned, coherent set of strategies to accommodate growth. Developments in the area include the South Block Development, the St. George replacement airport, and the Leucadia development (see Figure 1-4, Future Developments). These developments have been incorporated into the future land use plans for St. George, Washington City, and Hurricane.

By mixing land uses, preserving open spaces, and providing a range of housing opportunities, planners have allowed for smart growth in the Southern Corridor

area. The goal of smart growth is to protect community, economic, and environmental values through sustainable development so that coherent, vibrant communities emerge (see Chapter 6, Smart Growth). While these communities typically experience a reduced number of vehicle trips and reduced trip lengths in an overall network, large-scale access remains critical to the success of the community. The 2001 St. George Draft Land Use Plan identifies several locations for planned mixed use in the southeastern part of the city.

With the construction of the St. George replacement airport, the need for direct access to I-15, to north-south arterials, and to SR 9 will become even more critical. If the Southern Corridor were not constructed, planned communities in the southeast parts of St. George and the southern part of Washington City would have no direct access to I-15. Furthermore, these communities would not have the benefit of a high-speed arterial that connects to local arterials and collectors and allows reasonable access between St. George, Washington City, and Hurricane. Access would be limited to existing arterial streets, which are constrained geographically by natural features and existing development (see Figure 1-3, Natural Constraints). The Southern Corridor is a key component in the cities' land use planning and would provide a critical connection to planned development in and around the corridor.

1.6.1.2 Network Level of Service

Design year 2030 ADT volumes were obtained from the QRSII model for the No-Build Alternative. The No-Build Alternative includes all planned state and municipal transportation projects except the Southern Corridor. Key links in the roadway network were selected to evaluate the LOS on each resulting project from the forecasted ADTs. Planning level capacity analyses were completed using the forecasted volume-to-capacity ratio as an indication of LOS. The threshold for the capacity analysis was LOS E, since the transition from LOS E to LOS F represents the point where the system breaks down operationally. Table 1.6-1 outlines the findings of the modeling and LOS analyses.

Table 1.6-1. Volume-to-Capacity Summary for Key Network Links

Segment	Lanes	Capacity for LOS F	2030 No-Build Volume (ADT)	2030 No-Build Volume/ Capacity	2030 No-Build LOS
SR 9 Segments					
SR 9 at 4400 West (West Leg)	5	39,000	59,398	1.52[a]	F
SR 9 at 1760 West (East Leg)	5	39,000	35,533	0.91	E
Brigham Road Segments					
Brigham Road (I-15 to Frontage Road)	3	16,500	26,020	1.58[a]	F
Brigham Road at Node 45 (Interchange Between Frontage)	3	16,500	40,621	2.46[a]	F
Brigham Road at River Road (West Leg)	3	16,500	23,529	1.42[a]	F
I-15 Segments (Existing Cross-Section)					
I-15 NB (Atkinville to Brigham)	2	44,500	19,369	0.44	A–C
I-15 SB (Atkinville to Brigham)	2	44,500	19,369	0.44	A–C
I-15 NB (Brigham to Bluff)	2	44,500	36,880	0.83	E
I-15 SB (Brigham to Bluff)	2	44,500	34,052	0.77	D
I-15 NB (Bluff to St. George)	2	44,500	36,428	0.82	E
I-15 SB (Bluff to St. George)	2	44,500	36,316	0.82	E
I-15 NB (St. George to Green Springs)	2	44,500	43,394	0.98	E
I-15 SB (St. George to Green Springs)	2	44,500	49,876	1.12	F
I-15 NB (Green Springs to RP 13)	2	44,500	43,987	0.99	E
I-15 SB (Green Springs to RP 13)	2	44,500	45,585	1.02	F
I-15 NB (RP 13 to SR 9)	2	44,500	44,018	0.99	E
I-15 SB (RP 13 to SR 9)	2	44,500	42,706	0.96	E
River Road Segments					
River Road at Brigham Road (North Leg)	3	15,000	30,131	2.01[a]	F
River Road at Brigham Road (South Leg)	3	15,000	46,012	3.07[a]	F
River Road at 2450 South (North Leg)	3	15,000	27,602	1.84[a]	F
River Road at Riverside (South Leg)	5	39,000	61,351	1.57[a]	F
River Road at 100 South (South Leg)	5	39,000	27,869	0.71	D
2450 South Segments					
2450 South at River Road (East Leg)	3	15,000	22,556	1.50[a]	F
2450 South at Little Valley (West Leg)	3	15,000	20,236	1.35[a]	F

Segment	Lanes	Capacity for LOS F	2030 No-Build Volume (ADT)	2030 No-Build Volume/ Capacity	2030 No-Build LOS
Miscellaneous Segments					
Industrial (Washington Fields to Telegraph)	5	15,000	9,052	0.60	D
RP 13 Connector (Telegraph to I-15)	5	39,000	9,964	0.26	A–C
Telegraph at Main St. (West Leg)	3	39,000	14,533	0.37	A–C
Little Valley at 2450 South (South Leg)	3	15,000	18,933	1.26[a]	F
3000 East at 1450 South (South Leg)	3	15,000	17,342	1.16	F
2450 East (Riverside to 2000 South)	3	15,000	20,570	1.37[a]	F
Washington Dam at Washington Fields (East Leg)	3	15,000	12,208	0.81	E
Pineview at Industrial (North Leg)	3	15,000	10,314	0.69	D
Washington Fields at Industrial (South Leg)	5	39,000	14,679	0.38	A–C

NB = northbound SB = southbound

[a] Unachievable volume/capacity ratio, likely resulting in rerouting.

1.7 Legislation and Initiatives

Numerous studies have been conducted that demonstrate a need to invest in the Southern Corridor transportation system. One regional plan and seven local plans support the implementation of the Southern Corridor, and are described in Section 1.1.3, Area Planning Studies.

1.8 Conclusion

The transportation system in the St. George, Washington City, and Hurricane area is faced with the following issues:

- A need for a regional transportation facility to enhance the current and future transportation network and be consistent with city plans
- A future lack of capacity in the southern limits of the local cities to meet future travel demand
- Access issues to manage continued growth and development
- Physical and topographic limitations to developing an efficient grid system

1.8.1 Summary of Corridor Needs and Deficiencies

Regional Transportation Facility. The study area currently lacks a regional facility to accommodate travel in areas where future growth will occur and to provide a linkage between St. George, Washington City, and Hurricane. Without a regional facility to support future planned development, the existing regional transportation network would not provide an efficient system to allow the local cities to plan for and accommodate future growth.

Future Transportation Demand. As Table 1.6-1 above demonstrates, with the continued expected growth in the region, many arterial roads would reach an unacceptable LOS by 2030. This congestion would limit access between St. George, Washington City, and Hurricane. In addition, many of the existing arterial facilities were designed around the physical and environmental limitations in the region and support a limited amount of traffic. As planned developments are implemented to handle the anticipated growth, these deficiencies would contribute to congestion, slower traffic speeds, and increased accidents.

Continued Growth and Development. Annual growth rates by municipality are expected to continue at a high level within the planning period (see Table 1.5-1 and Table 1.5-2 above). Population in St. George in 2030 is forecasted to reach 147,990 from 37,526 in 1994. Population in the five cities in the region (Ivins, Santa Clara, St. George, Washington City, and Hurricane) is expected to grow from 53,626 in 1994 to 208,641 in 2030. As new development is constructed to accommodate this growth, a well-planned transportation system will be needed to meet the increase in demand as well as to provide access to the new development currently planned by the cities in the region.

Physical and Topographic Limitations. The regional linkage system in the study area is currently limited, primarily because of geographic and environmental constraints (such as rock formations and the Virgin River) along boundaries in the region. Using Salt Lake City and Phoenix as examples, efficient grid systems have been built to facilitate traffic movement and provide system linkage with arterial routes. St. George and surrounding areas have been unable to build an efficient grid system because of topographical constraints.

1.8.2 Purpose of Alternatives

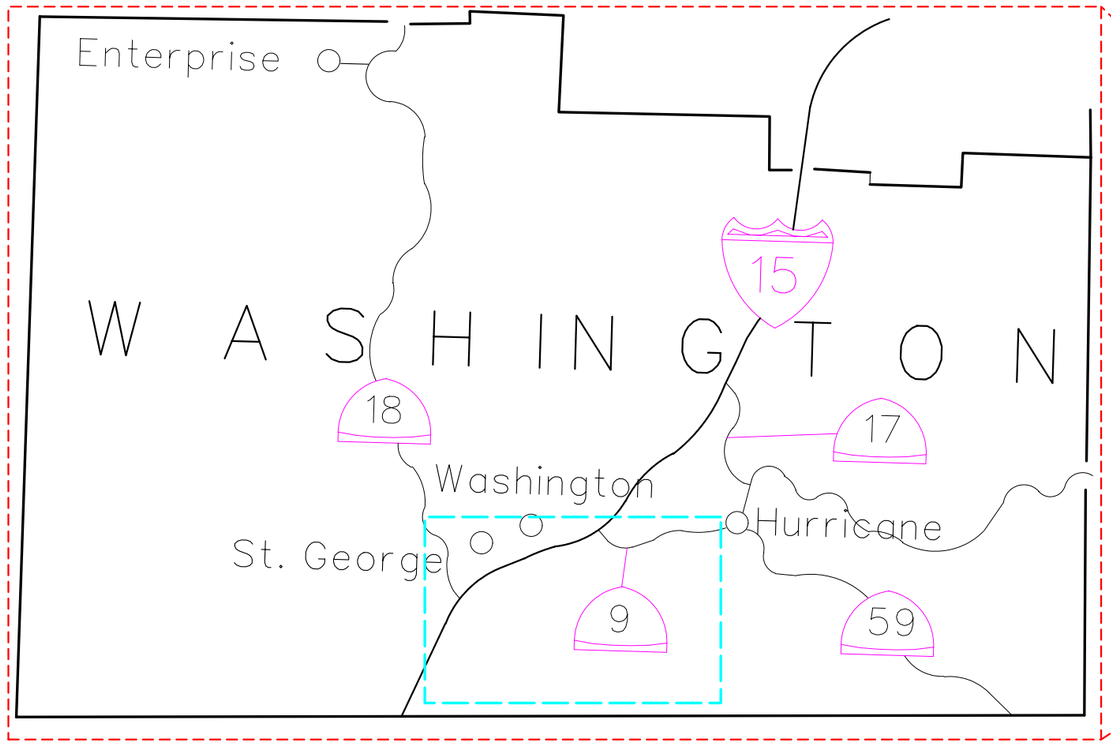
St. George and the surrounding area are rapidly growing, as shown by the development of an industrial park, the proposed airport, the Sand Hollow Reservoir, and many planned communities/subdivisions south and east of I-15. The existing transportation infrastructure in this area is inadequate to meet the needs of this growth.

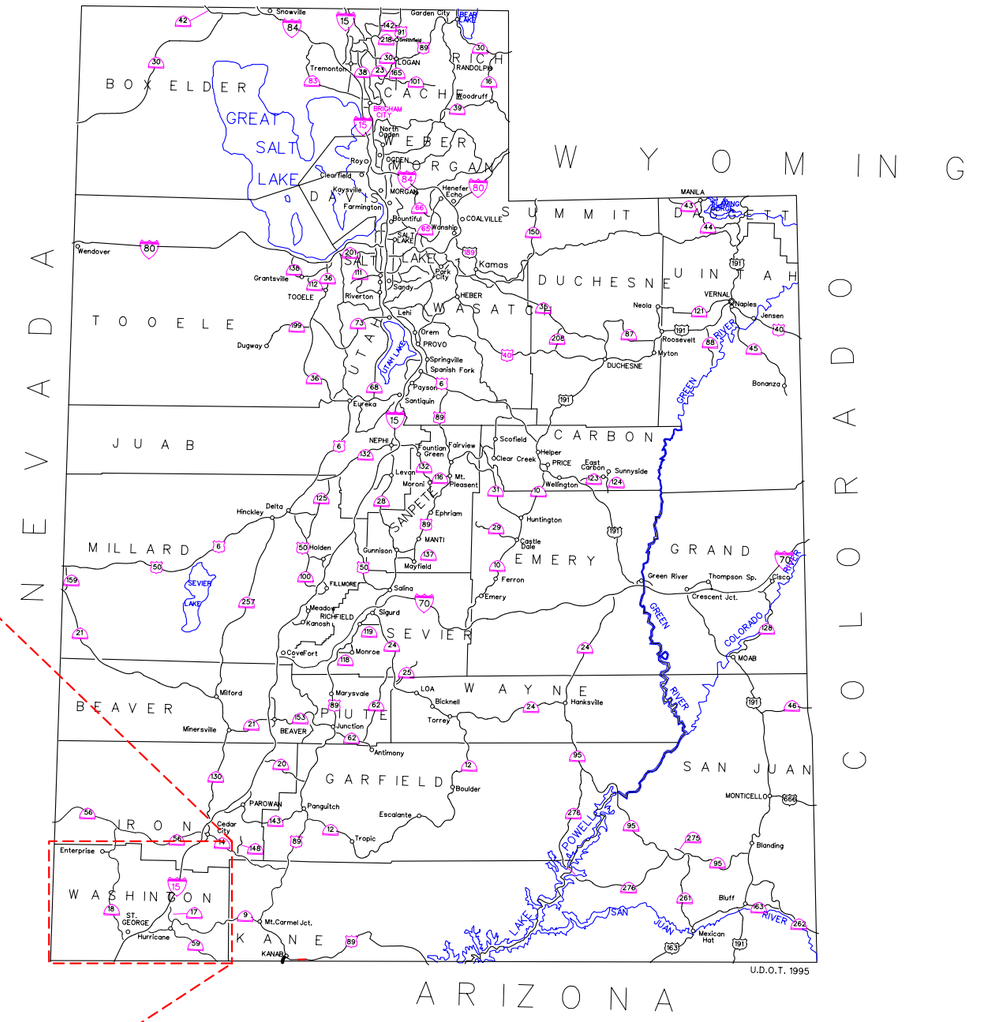
The study area lacks a transportation facility that provides a seamless linkage between the municipalities and developed areas in the region. In response, travelers currently use collector and arterial roadways. These roadways are not designed for regional travel and are often restricted by geographic and environmental constraints.

The primary purpose of the Southern Corridor is to provide a regional transportation facility between St. George, Washington City, and Hurricane that would complement local land use plans. The corridor would also accommodate areas of future growth, reduce some traffic on the existing and future network of arterial and city streets, and improve conditions in areas already developed. The Southern Corridor is not being proposed to reduce traffic on I-15 through St. George, Washington City, and Hurricane.

The following benefits would be provided by the proposed Southern Corridor:

- It would serve as an alternate route for I-15 through St. George if I-15 is closed or congested and during required highway reconstruction.
- It would provide alternate access to and from Zion National Park and Lake Powell for tourists traveling on I-15 from south of St. George.
- It would provide alternate routing for truck traffic that generally uses arterials and other routes.
- It would help BLM better manage off-highway vehicle (OHV) uses by providing few access points to the areas of critical environmental concern (ACECs). The open terrain in the greater Warner Valley allows unauthorized OHV access to BLM-administered lands that have been designated as ACECs. The ACECs were designated to provide additional protection for sensitive resources, including federally listed plants and habitat, under the Endangered Species Act.
- USFWS has stated that the proposed highway and ROW, if properly sited, would provide protection to sensitive habitat that harbors populations of plant species designated and proposed as endangered under the Endangered Species Act on lands not under federal jurisdiction.





LEGEND

Project Location

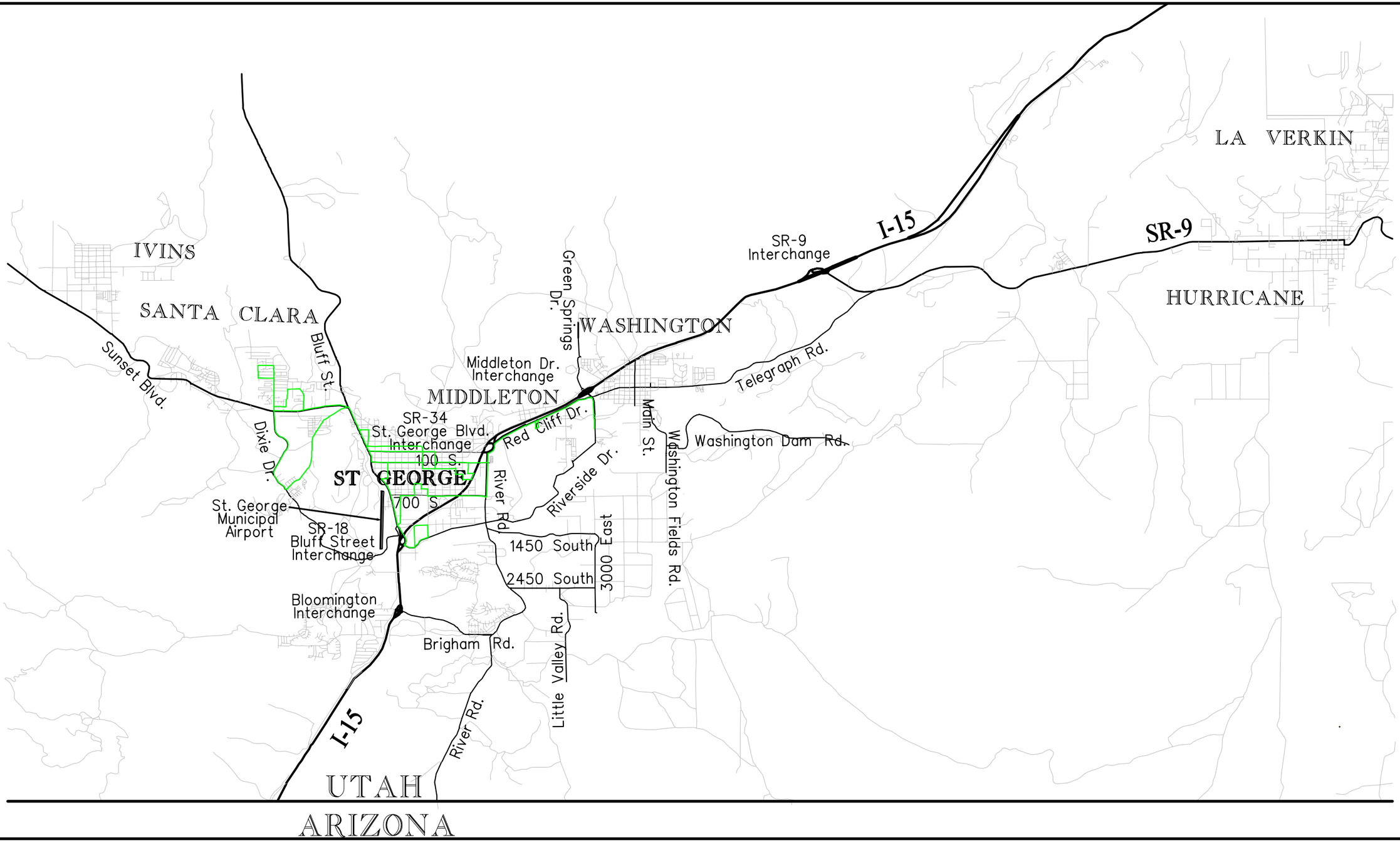
N
W E
S

Figure 1-1

PROJECT LOCATION

Southern Corridor EIS
March 2003

HDR Engineering, Inc.
SALT LAKE CITY, UTAH



LEGEND

Bus Route

0 5000 10000
FEET

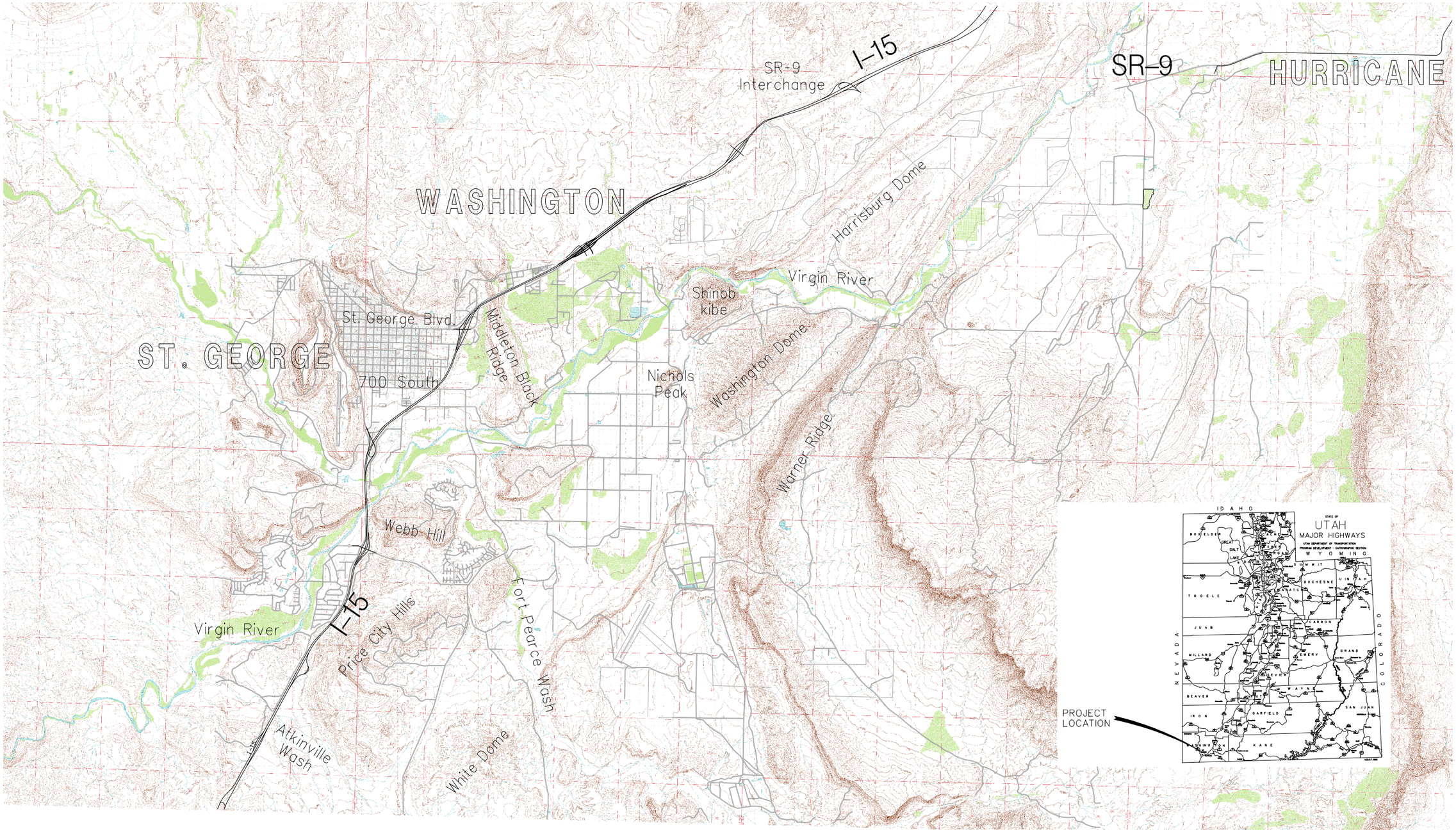
N
W E
S

Figure 1-2

REGIONAL AND LOCAL ROADWAYS

Southern Corridor EIS
March 2003

HDR Engineering, Inc.
SALT LAKE CITY, UTAH



LEGEND

0 5000 10000
FEET

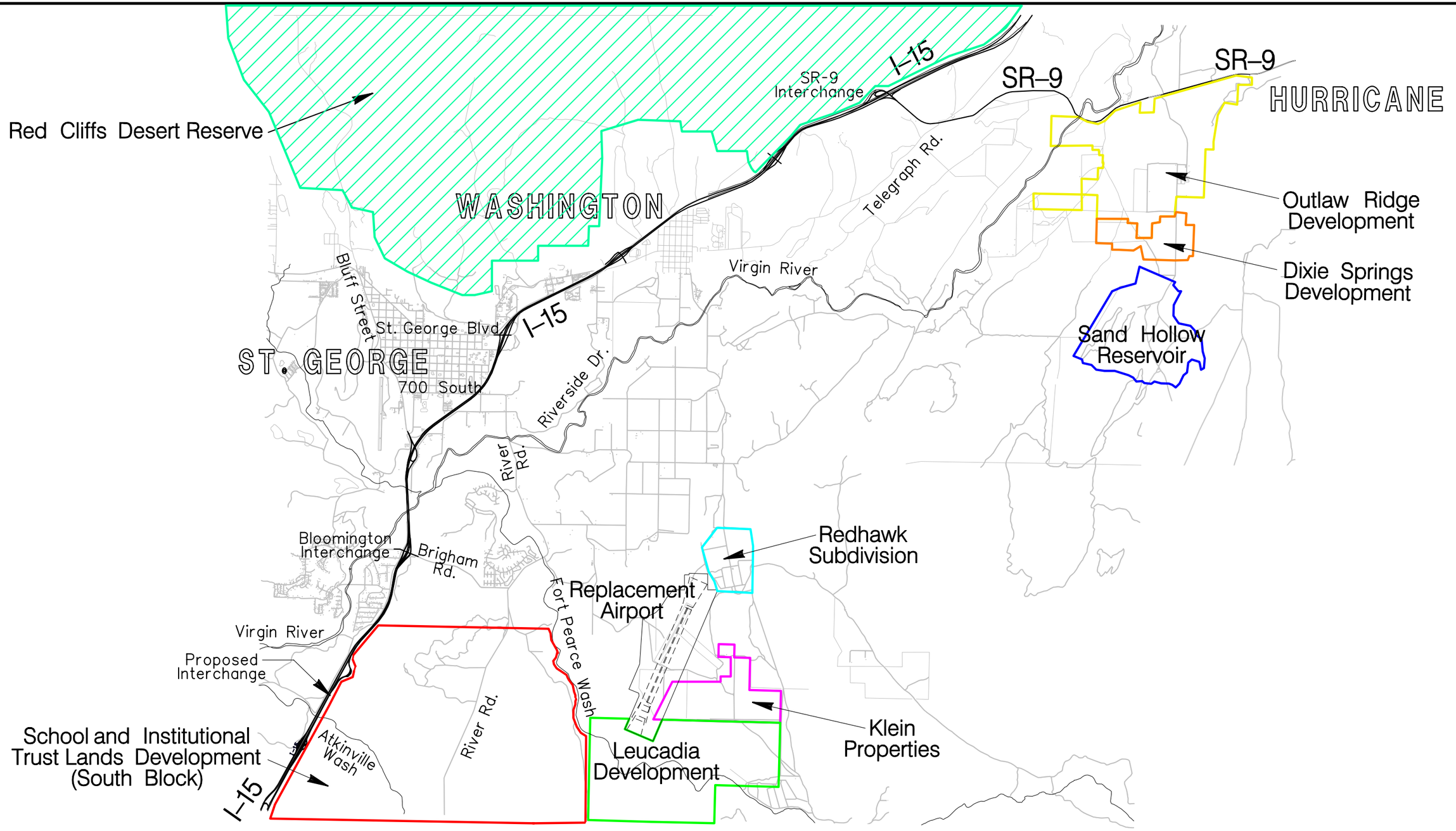
N
W E
S

Figure 1-3

NATURAL CONSTRAINTS

Southern Corridor EIS
March 2003

HDR Engineering, Inc.
SALT LAKE CITY, UTAH



LEGEND

Red Cliffs Desert Reserve

0 5000 10000

FEET

N

W E

S

Figure 1-4

FUTURE DEVELOPMENTS

Southern Corridor EIS
March 2003

HDR Engineering, Inc.
SALT LAKE CITY, UTAH